

BLUEPRINT FOR A PIECE: IAN SHANAHAN'S SURE-FIRE RECIPE FOR MUSIC COMPOSED OF FRACTAL SOUNDS GENERATED BY A PREPARED ALTO RECORDER.

Respectfully offered to *Rainer Linz*, on receiving a well-deserved *Sounds Australian Award* in 1991.

INTRODUCTION

If one accepts the premise that any piece of monophonic music for solo melodic instrument (such as Edgard Varèse's **Density 21.5**) is essentially uni-dimensional, whereas an example of Renaissance polyphony (such as John Taverner's **Western Wynde Mass**) is bi-dimensional (because it places equal importance upon musical line and simultaneity), then the sounds proposed in what follows may be regarded as "fractal". They fall somewhere within the continuum between purely linear (uni-dimensional) and melody-plus-harmony (bi-dimensional) musics. That is to say, their perceived acoustic dimension is greater than one but less than two – genuinely fractional-dimensional or "fractal" (as Mandelbrot would have it).

↑ = harmony, synchronicity, simultaneity, verticals;
↔ = melody, asynchronicity, diachronic, horizontal, linear.

THE MATERIALS

During the course of research carried out with a Moeck Rottenburgh alto recorder, I discovered nearly 500 fingerings that exhibit properties analogous to the 'Strange Attractors' of Chaos Theory. In nearly all instances, these fingerings' 1st- and 2nd-register tones – and sometimes their higher-register tones as well – are unstable, permitting random, chaotic oscillations between them according to the controlling parameters of articulation and air-flow.

The Controlling Parameters

≡ – *Alveolar (tongue-tip) fluttersong*. A 'trilling' of the tongue-tip against the alveolar ridge.

At an iteration rate of approximately 30 Hz (cycles-per-second), these oscillations create a psychoacoustical illusion of simultaneity (prompting me to dub the resultant sonorities "pseudo-multiphonics"). The central auditory processor of the human brain is tricked into believing that each tone is continually present – in the same way that false optical continuity is attained with cinematographic film (running at 24 "frames"-per-second) or with a fluorescent light-tube (which, with Australia's AC electrical current, switches on and off at a rate of 50 Hz).

✱ – *tongue-tremolo*. Articulate, as quickly and as evenly as possible, the (double-tonguing) phonemes '[d]idlidlidlidl...' – as in "fiddle" – at approximately 20 Hz.

Slower, or more specific, tongue-strokes are best indicated with grace notes in analogue (or time-space) notation and specific phonemes ('t', 'p', 'k', etc.). Tongue-tremoli engender highly unpredictable alternations according to micro-variations of articulation intensity. There is a lower or lesser sense of simultaneity than with fluttersong: linearity is heightened.

– *Pulmonary action*. My suggested notation utilizes a graphic contour between extremes relating to breath-pressure requirements for attaining each tone alone:

2nd register – —————
a graphic waveform contour
1st register – —————

Air-flow is subjected to glottal and laryngeal control. Together with articulation intensity, air-pressure governs the statistical weighting of appearance for each tone in the overall sonority. Without an overlay of tongue activity – that is, articulation superimposed over a continuous air-stream – throat-controlled undulations in breath-pressure can generate quasi-regular “breath trills”, or irregular oscillations.

The Fingerings

I have selected 22 fingerings (*cf* the book **22 Australian Composers**) in which the alto recorder is ‘prepared’ beforehand by having its endhole closed completely airtight with a malleable gummy substance like “Blutac”, “Bostik”, or “Plasticine”, or instead with a rubber or cork plug. Within the fingerings’ tablature pictographs, this preparation is denoted with a square solid black box beneath the other fingerhole symbols.

(a) Micro-intervals, and pitch designation.

- \flat = a semitone flat from \flat then up to another eighthtone flat from \flat ;
- \flat = a semitone flat from \flat ;
- \flat = a semitone flat from \flat then up to an eighthtone sharp from \flat ;
- \flat = a quartertone flat from \flat then up to another eighthtone flat from \flat ;
- \flat = a quartertone flat from \flat ;
- \flat = a quartertone flat from \flat then up to an eighthtone sharp from \flat ;
- \flat = up to an eighthtone flat from \flat ;
- \flat = an in-tune \flat ;
- \flat = up to an eighthtone sharp from \flat ;
- \sharp = a quartertone sharp from \flat then up to an eighthtone flat from \sharp ;
- \sharp = a quartertone sharp from \flat ;
- \sharp = a quartertone sharp from \flat then up to another eighthtone sharp from \sharp ;
- \sharp = a semitone sharp from \flat then up to an eighthtone flat from \sharp ;
- \sharp = a semitone sharp from \flat ;
- \sharp = a semitone sharp from \flat then up to another eighthtone sharp from \sharp ;

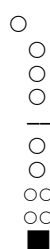
F \flat 1 denotes the lowest regular pitch on the alto recorder (obtained with all fingerholes closed, but with the endhole open); F \flat 2 denotes the F \flat one octave higher; and so forth.

(b) Register numbers of elicited pitches are given between curly brackets { } in respective order.

(c) Tablature symbols, and the basic tablature pictograph template.

- = an open fingerhole;
- ⊙ = a shaded fingerhole;
- ◐ = a half-closed fingerhole;
- ◑ = a vented fingerhole;
- = a closed fingerhole;
- = the endhole is closed airtight.

The basic tablature pictograph template is:



1. E \sharp 1, G \flat 2, B \sharp 2 {1, 2, 3}



2. F \flat 1, G \sharp 2, B \sharp 2 {1, 2, 3}



3. F \sharp 2, G \sharp 2, B \sharp 2 {1, 2, 3}



4. F \flat 2, G \sharp 2 {1, 2}



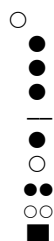
5. G \flat 1, D \flat 1 {1, 2}



6. E \flat 1, F \sharp 2 {1, 2}



7. D \sharp 1, B \flat 2 {1, 3}



8. D \flat 1, F \sharp 2 {1, 2}



9. F \flat 1, G \flat 2 {1, 2}



10. C \sharp 1, E \flat 1 {1, 2}



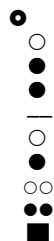
11. B \flat 1, F \sharp 2 {1, 2}



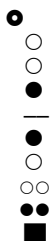
12. C \sharp 1, G \sharp 2 {1, 2}



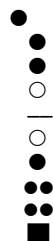
13. E \flat 1, F \sharp 2 {1, 2}



14. F \flat 2, G \flat 2 {1, 2}



15. B \flat 1, D \sharp 1 {1, 2}



16. C# 1, E♭ 1 {1, 2}



17. B♭ 1, E♭ 1 {1, 2}



18. G♯ 1, D# 1 {1, 2}



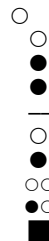
19. F# 2, G# 2 {1, 2}



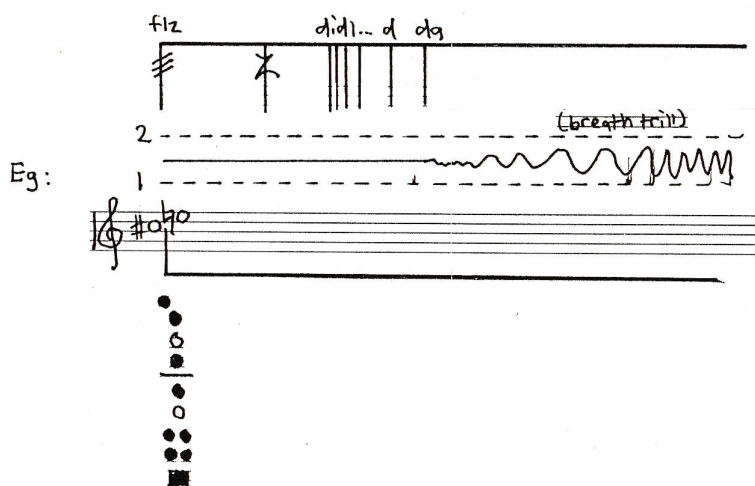
20. F# 2, G♭ 2 {1, 2}



21. F# 2, G♯ 2 {1, 2}



22. F# 2, G# 2 {1, 2}



THE PIECE

Provide your own form and structure: compose it yourself (based upon these materials)!

ADDENDUM (JULY 2017)

Those composers who are interested in utilizing this material to create a new piece, as well as recorder-players who might wish to engage with these resources, would do well to consult my thesis **Recorder Unlimited**, in particular Section 2.4.5 therein. **Recorder Unlimited** can be downloaded from the Google Drive website; the relevant URL is < <https://drive.google.com/drive/folders/0ByQqOn4hytL4TkFRVEMwelhpUFU> >.

Ian Shanahan, Sydney, Australia, 22 May 1991.